



## **SAW Components**

### **SAW Diversity Rx filter**

WCDMA Band II

<b>Series/type:</b>	<b>B9470</b>
<b>Ordering code:</b>	<b>B39192B9470M410</b>
<b>Date:</b>	<b>September 09, 2011</b>
<b>Version:</b>	<b>2.2</b>



SAW Components

B9470

SAW RF Filter

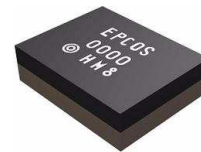
1960.0 MHz

Data Sheet

**SMD**

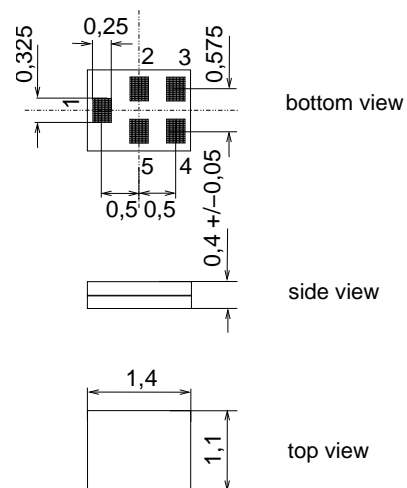
### Application

- Low-loss RF filter for mobile telephone WCDMA Band II systems (diversity) receive path (RX)
- Usable for diversity application
- Usable passband 60 MHz
- Unbalanced to balanced operation (50Ω /100Ω)



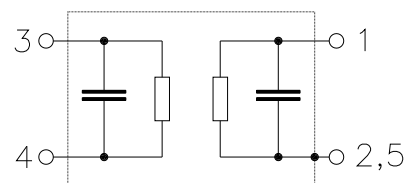
### Features

- Package size 1.4 x 1.1 x 0.4 mm<sup>3</sup>
- RoHS compatible
- Approximate weight 0.003 g
- Package for **Surface Mount Technology (SMT)**
- Ni, gold-plated terminals
- **Electrostatic Sensitive Device (ESD)**
- **Moisture Sensitive Level 3**



### Pin configuration

- 1 Input, unbalanced
- 3,4 Output, balanced
- 2,5 To be grounded



Please read *cautions and warnings and important notes* at the end of this document.



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**Data Sheet**



**Characteristics**

Temperature range for specification:  $T = -30\text{ °C to }+85\text{ °C}$   
 Terminating source impedance:  $Z_S = 50\ \Omega$  (unbalanced)  
 Terminating load impedance:  $Z_L = 100\ \Omega \parallel 22\text{ nH}$  (balanced)

		min.	typ. @ 25 °C	max.	
<b>Center frequency</b>	$f_C$		1960.0		MHz
<b>Maximum insertion attenuation</b>					
	1930.0 ... 1990.0 MHz $\alpha$		3.5	4.3 <sup>1)</sup>	dB
@ $f_{\text{carrier}}$	1932.4 ... 1987.6 MHz $\alpha_{\text{WCDMA}^2}$		3.1	4.0	dB
<b>Amplitude ripple (p-p)</b>	$\Delta\alpha$				
	1930.0 ... 1990.0 MHz		1.9	2.7	dB
<b>Error Vector Magnitude</b>	EVM <sup>3)</sup>				
@ $f_{\text{carrier}}$	1932.4 ... 1987.6 MHz		3.0	4.5	
<b>CMRR</b> ( $ S_{21}-S_{31}  /  S_{21}+S_{31} $ )					
	1930.0 ... 1990.0 MHz CMRR <sup>4)</sup>	21	24		dB
<b>Input VSWR</b>					
	1930.0 ... 1990.0 MHz		2.1	2.5	
<b>Output VSWR</b>					
	1930.0 ... 1990.0 MHz		2.1	2.5	
<b>Attenuation</b>	$\alpha$				
	10.0 ... 1850.0 MHz	40	53		dB
	810.0 ... 849.0 MHz	50	73		dB
	898.0 ... 925.0 MHz	50	72		dB
	1850.0 ... 1910.0 MHz	46	48		dB
@ $f_{\text{carrier}}$	1852.4 ... 1907.6 MHz $\alpha_{\text{WCDMA}^2}$	46	48		dB
	2400.0 ... 2484.0 MHz	40	60		dB
	2484.0 ... 5000.0 MHz	40	45		dB
	5000.0 ... 6000.0 MHz	35	43		dB

1) 4.1 dB  $T = 0^\circ$  to  $+85^\circ$ , 4.2 dB  $T = -20^\circ$  to  $0^\circ$   
 2) Attenuation of WCDMA signal ("Powertransferfunction"). Please refer to annotation on page (4).  
 3) Error Vector Magnitude (EVM) based on definition given in 3GPP TS 25.141.  
 4) A combination of 5° phase balance and 1 dB amplitude balance corresponds to 23 dB CMRR



**SAW Components** **B9470**

**SAW RF Filter** **1960.0 MHz**

Data Sheet **SMD**

**Maximum ratings**

Storage temperature range	T <sub>stg</sub>	-40/+85	°C	
DC voltage	V <sub>DC</sub>	3	V	
ESD voltage	V <sub>ESD</sub>	50 <sup>1)</sup>	V	machine model, 10 pulses
Input power at				
1850.0 ... 1910.0 MHz		15	dBm	CW signal @ T=50°C, 2000h
else where	P <sub>IN</sub>	10	dBm	

1) acc. to JESD22-A115A (machine model), 10 negative & 10 positive pulses.

**Annotation for characteristics section**

Attenuation of WCDMA signal ("Powertransferfunction",  $\alpha_{WCDMA}$ ) is determined by

$$\int_{-\infty}^{\infty} |S_{ds2l}(f)H_{RRC}(f - f_{Carrier})|^2 df$$

$f_{Carrier}$  according to 3GPP TS 25.101 (e.g. for UMTS-Passband,  $f_{Carrier}$  ranges from 1932.4 MHz (lowest Rx channel) to 1987.6 MHz (highest Rx channel)).  $H_{RRC}(f)$  is the transfer function of the root-raised cosine transmit pulse shaping filter according to 3GPP TS 25.101 with the following normalization:

$$\int_{-\infty}^{\infty} |H_{RRC}(f)|^2 df = 1$$



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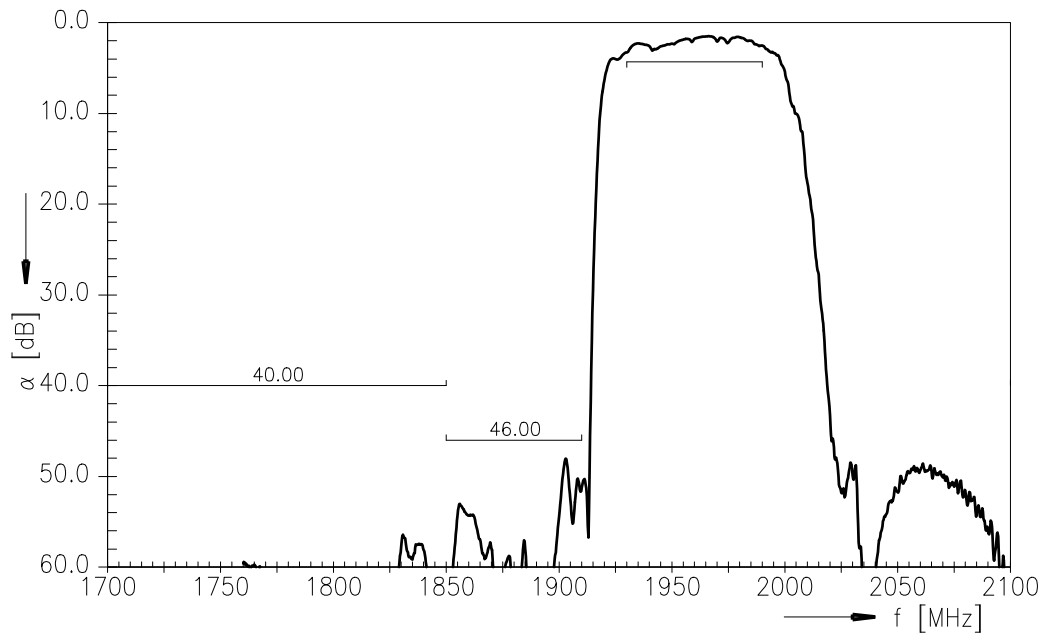
SAW RF Filter

1960.0 MHz

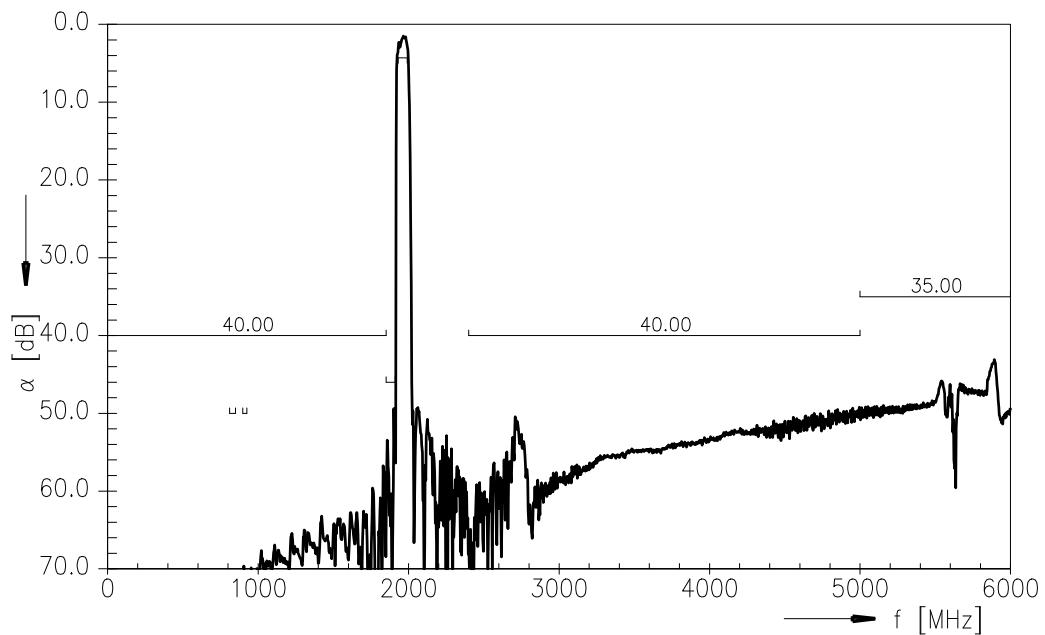
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Transfer function



Transfer function (wideband)



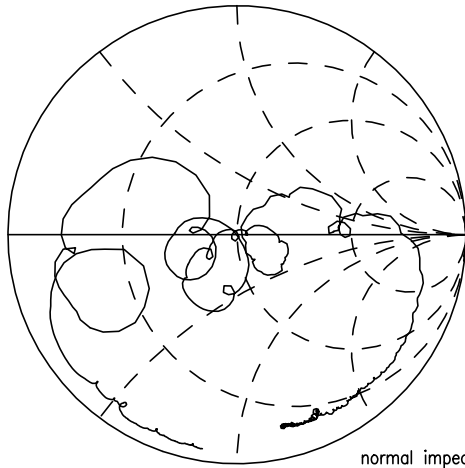
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Data Sheet

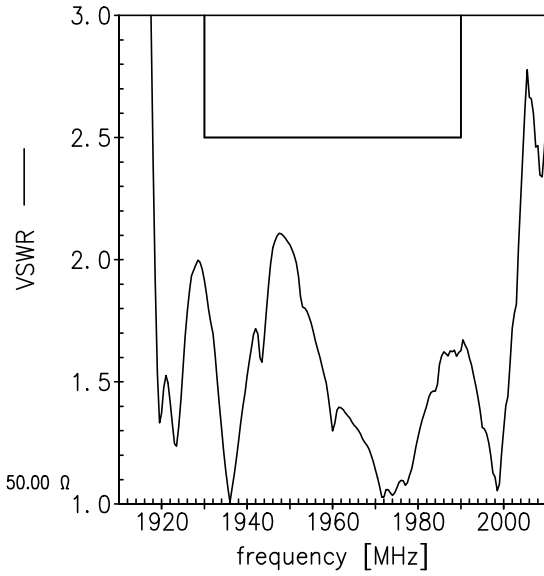
**SMD**

Smith chart

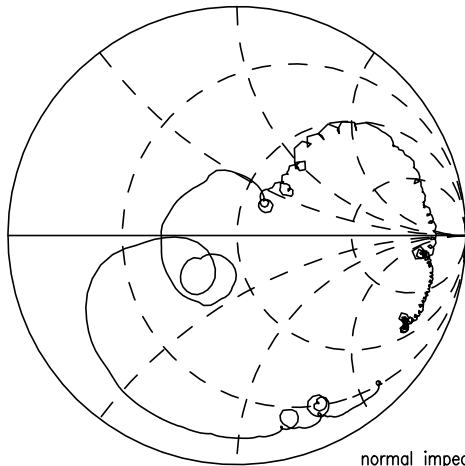
$S_{11}$  function



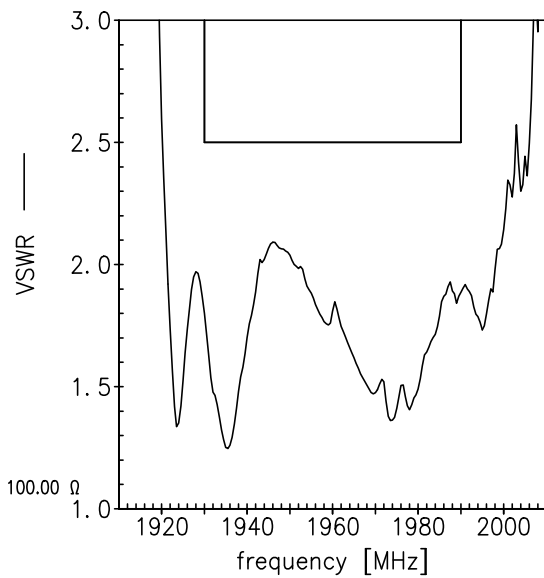
normal impedance: 50.00  $\Omega$



$S_{22}$  function



normal impedance: 100.00  $\Omega$





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<b>SAW RF Filter</b>	<b>1960.0 MHz</b>
<b>Data Sheet</b>	<b>SMD</b>

## References

<b>Type</b>	B9470
<b>Ordering code</b>	B39192B9470M410
<b>Marking and package</b>	C61157-A8-A3
<b>Packaging</b>	F61074-V8237-Z000
<b>Date codes</b>	L_1126
<b>S-parameters</b>	B9470_UN_NB.s3p, B9470_UN_WB.s3p See file header for port/pin assignment table.
<b>Soldering profile</b>	S_6001
<b>RoHS compatible</b>	defined as compatible with the following documents: CTIVE 2002/95/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 27 January 2003 on the restriction of the use of certain hazardous substances in electrical and electronic equipment. 2005/618/EC from April 18th, 2005, amending Directive 2002/95/EC of the European Parliament and of the Council for the purposes of establishing the maximum concentration values for certain hazardous substances in electrical and electronic equipment."
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